E-ISSN: 2618-0618
P-ISSN: 2618-060X

www.agronomyjournals.com
2024; SP-7(9): 1010-1013
Received: 11-07-2024
Accepted: 17-08-2024

Bhoomika Choudhary
Department of Agronomy, School of Agriculture, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Vaishali Chaturvedi
Department of Agronomy, School of Agriculture, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Devi Lal Dhaker
Department of Agronomy, School of Agriculture, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Surya Parkesh
Department of Agronomy, School of Agriculture, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Sonu
Department of Agronomy, School of Agriculture, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Ravina Rojh
Department of Agronomy, School of Agriculture, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Corresponding Author:
Bhoomika Choudhary
Department of Agronomy, School of Agriculture, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Effect of different post-emergence herbicides on the growth and yield of mungbean (*Vigna radiate* L.)

Bhoomika Choudhary, Vaishali Chaturvedi, Devi Lal Dhaker, Surya Parkesh, Sonu and Ravina Rojh

DOI: https://doi.org/10.33545/2618060X.2024.v7.i9Sn.1651

Abstract
A field experiment was conducted at Research Farm of Suresh Gyan Vihar University, Jaipur (Rajasthan) during *kharif* 2023 on sandy loam soil which consisted 11 treatments of different doses of post emergence herbicides *i.e.* Fomesafen, Propaquizafop and Imazethapyr including weed free, hand weeding and weedy check plot in randomized block design. The variety "RMG-492" were used for experiment. Results clearly showed that treatment (T_{10}) *i.e.* weed free plot significantly increased plant height, dry matter accumulation, number of branches plant^{-1}, number of nodules plant^{-1}, number of pods plant^{-1}, number of seeds pod^{-1}, seed, straw and biological yield over control however, it was remained statistically at par with two hand weeding (T_9).

Keywords: Post-emergence, Herbicide, Handweeding, Mungbean

Introduction
Pulses stand a strategic position in the agriculture economy of our country. They contain high percentage of quality protein three times more than cereals. Pulses contain vitamin B, minerals and also contain a certain quality fiber, which is desirable in human diet because of medical consideration. Mungbean is one of the most important pulse crops and an excellent source of high-quality protein. It is also used as sprout, salad, vegetable, and some Indian dishes like curry, sevpuri, panipuri or Indian chat sprout salad. India alone accounts for 65% of its world acreage and 54% of the total production. It is an important pulse crop having high nutritive value. It is also considered as a cheap source of protein and other minerals. Due to short duration nature, it is an excellent crop to fit in intercropping system with different major crops. It is an important conventional pulse crop of India. The calorific value of green gram is 334 calories per 100 g. it is known for high nutritional content crude protein 24.0%, fat 1.3%, carbohydrate 56.6%, minerals 3.5%, lysine 0.43%, methionine 0.10% and tryptophan 0.04%. The World Health Organization recommends a per capita consumption of pulses at 80 gram/day and the Indian Council of Medical Research (ICMR) has recommended a minimum consumption of 40 g/day. It has a wide range of adaptability due to short growth period, high tonnage capacity and outstanding nutritional values of food, feed and forage. Pulse are important in agriculture and society for a variety of reasons, including their nutritional value, vegetarian diet, capacity to enhance soil fertility, minimal resource and water requirement (Patel *et al*., 2020) [6].
Weed infestation is one of the major biotic factors which is limiting growth and productivity of greengram crop. Yield reduction in greengram ranges from 35% to 80% depending on the type and weed flora associated with the crop. Critical period of crop weed competition for *Kharif* greengram crop is 20-40 DAS (Sheoran *et al*. 2008) [7]. In greengram, weed problem can be successfully managed by utilizing mechanical practices like hand weeding and inter-cultivation. But in the present scenario, timely availability of labour is a major constraint and continuous rainfall during the rainy season obstructs timely manual operations. Among different weed management practices, hand weeding is traditional and effective method but the unavailability of labor at peak weeding periods and increasing labor cost impose major limitations on economic feasibility of manual weeding.

Under such situations, the only alternative is the use of appropriate herbicides which can be effective and economically viable. Imazethapyr is an imidazolinone herbicide and it has soil and foliar activity, thus allowing flexibility in application timing. Fomesafen, chemically 5-[2-chloro-4-(trifluoromethyl) phenoxy]-N-(methyl-sulfonyl)-2-nitrobenzamide, one of the most promising of these materials, was introduced to controlling a wide range of annual broadleaf weeds in different crops.

Materials and methods

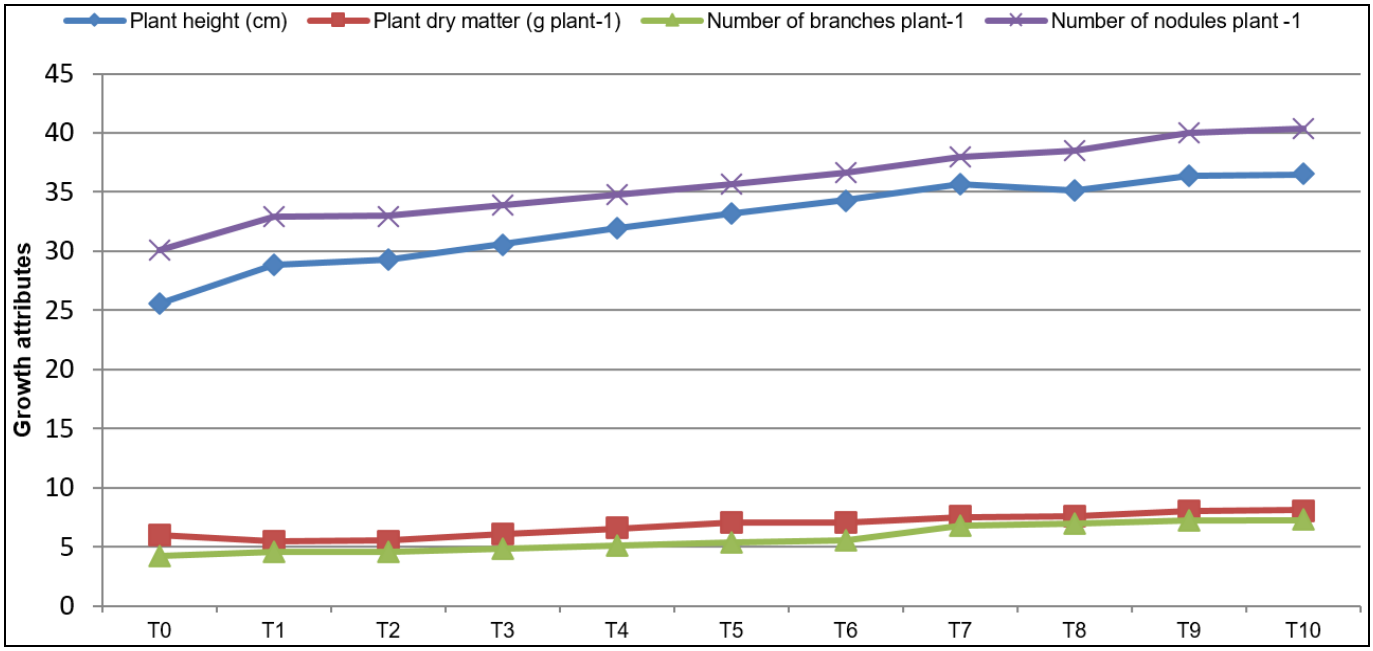
The field experiments were carried out during *kharif* season (2023) to study the "Effect of Different Post-Emergence Herbicides on the Growth and Yield of Mungbean (*Vigna radiate* L.)" in randomized block design (RBD) with consisted 11 treatments of different doses of post emergence herbicides *i.e.* Fomesafen, Propaquizafop and Imazethapyr including weed free, hand weeding and weedy check plot at Research Farm, Suresh Gyan Vihar University- Jaipur, Rajasthan. The experimental farm is geographically located at 75° 51'44" E longitude, 26°48'35'' N latitude and an altitude of 432 m above mean sea level (AMSL). The experimental fields were clay loam and the soil fertility status contained available nitrogen (137.8 kg ha^{-1}) by Subia and Asija 1996, available phosphorus (16.3 kg ha^{-1}) by Olsen *et al*. 1954 and available potassium (250.12 kg ha^{-1}) by Jackson, 1973. The organic carbon content was from 0.34-0.38 per cent. The weekly mean maximum and minimum temperatures were of temperature during both summers (40.6° C) and winters (2.7° C). The mean relative humidity fluctuated from 63.50 to 91 per cent during the crop season. The average rainfall is 557 mm per annum, which is mostly received during July to September. The sporadic showers during winters are also common, which are probably observed during this period. The experiments were laid out in randomized block design (RBD) with three replications and 11 treatments of combination of post emergence herbicides including weedy check and weed free plot *i.e*. weedy check (T_0), Fomesafen @ 250 gm *a.i* ha^{-1} PoE (T_1), Propaquizafop @ 100 gm *a.i* ha^{-1} PoE (T_2), Imazethapyr @ 100 gm *a.i* ha^{-1} PoE (T_3), Fomesafen @ 168 gm *a.i* ha^{-1}. + Propaquizafop @ 52 gm *a.i* ha^{-1} (T_4), Fomesafen @ 210 gm *a.i* ha^{-1}. + Propaquizafop @ 65 gm *a.i* ha^{-1} (T_5), Fomesafen @ 252 gm *a.i* ha^{-1}. + Propaquizafop @ 78 gm *a.i* ha^{-1} (T_6), Fomesafen @ 294 gm *a.i* ha^{-1}. + Propaquizafop @ 91 gm *a.i* ha^{-1} (T_7), Propaquizafop @ 50 gm *a.i* ha^{-1} + Imazethapyr @ 75 gm *a.i* ha^{-1} PoE (T_8), Two hand weeding (T_9) and weed free plot (T_{10}). The observation were recorded at harvest was analysed by statistical methods (Fisher, R.A. 1950) [1].

Result and Discussion

It is clear from the result of present study that, weed free plot (T_{10}) recorded higher growth attributes *viz.* plant height (36.50 cm), dry matter accumulation (8.12 g $plant^{-1}$), number of branches $plant^{-1}$ (6.67), number of nodules $plant^{-1}$ (40.34) at harvest which was at par with T ($_9$) *i.e.* hand weeding and superior to rest of the treatments. The reason for higher values on growth parameter can be discussed in the light of fact that application of weed control treatments lead to less weed competition. The reduction in weed competition through different weed management practices snot only favoured crop growth with abundant, availability of moisture, light and space but also reduced the weed interference, facilitating vigorous growth and development of crop plants. None of the weed management practices proved superior over the weed free treatment. It is well established fact that weed free plot has not weed crop competition that's why weed free plot was superior to all other treatments. These results are in close conformity with the findings of Sheoran *et al*., (2013) and Mirjha *et al*., (2014). Further, results revealed that yield parameters like number of pods $plant^{-1}$ (29.57), number of seeds pod^{-1} (6.96), seed (1034.63 kg ha^{-1}), straw (1809.72 kg ha^{-1}) and biological yield (2844.35 kg ha^{-1}) was observed under weed free plot (T_{10}) which was remained statistically ay par with hand weeding (T_9) and superior over weedy check. Higher attributes is due to lesser weed competition which provide better environment for crop growth and development. In these treatments weed population and their growth were controlled due to control of weed flush by herbicides and hand weeding. Relative weed free situation under weed management practices helped in reducing the crop weed competition and thus finally lead to higher vegetative growth and yield attributes. Similar findings have been reported by Singh *et al*., (2011) [10] Singh *et al*., (2013) [9], Mirjha *et al*., (2013) [3], Singh *et al*., (2014) [8] and Mishra *et al*. (2023) [4].

Table 1: Effect of post emergence herbicides on growth attributes of mungbean

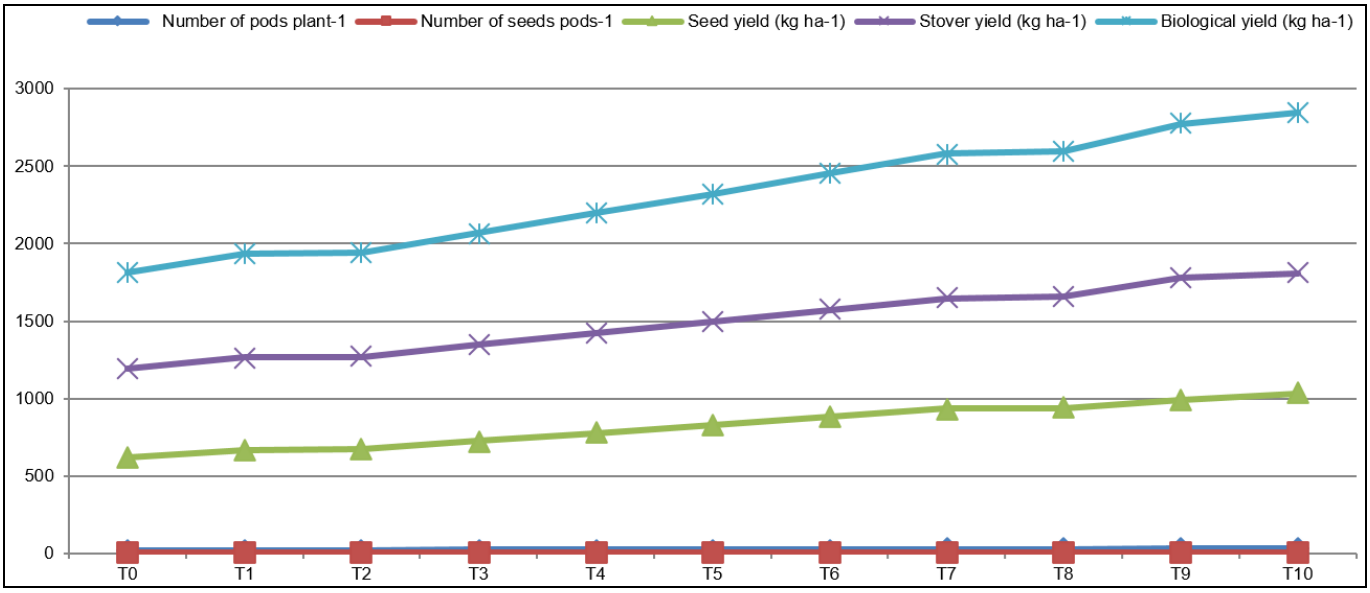
Treatments	Plant height (cm)	Plant dry matter (g $plant^{-1}$)	Number of branches $plant^{-1}$	Number of nodules $plant^{-1}$
T_0: Weedy Check	25.57	6.01	4.27	30.05
T_1: Fomesafen @ 250 g *a.i.* ha^{-1} PoE	28.83	5.43	4.56	32.92
T_2: Propaquizafop @ 100 g *a.i.* ha^{-1} PoE	29.27	5.51	4.62	32.97
T_3: Imazethapyr @ 100 g *a.i.* ha^{-1} PoE	30.61	6.06	4.84	33.87
T_4: Fomesafen @ 168 g *a.i.* ha^{-1} + Propaquizafop @ 52 *a.i.* ha^{-1}	31.96	6.54	5.09	34.79
T_5: Fomesafen @ 210 g *a.i.* ha^{-1}+Propaquizafop @ 65 g *a.i.* ha^{-1}	33.15	7.03	5.33	35.69
T_6: Fomesafen @ 252 g *a.i.* ha^{-1} + Propaquizafop 78 @ g *a.i* ha^{-1}	34.33	7.07	5.59	36.59
T_7: Fomesafen 294 @ g *a.i.* ha^{-1}+ Propaquizafop @ 91 g *a.i* ha^{-1}	35.65	7.52	6.83	37.99
T_8: Propaquizafop @ 50 g *a.i.* ha^{-1}+ Imazethapyr 75 @ g *a.i.* ha^{-1}	35.12	7.61	6.96	38.45
T_9: Two-hand weeding (15 DAS, 40-45DAS)	36.36	8.05	7.23	39.97
T_{10}: Weed free plot	36.50	8.12	7.27	40.34
SEm±	0.35	0.13	0.07	0.26
CD at (p= 0.05)	1.04	0.39	0.21	0.78
CV (%)	10.35	9.67	9.27	8.20



Graph 1: Effect of post emergence herbicides on growth attributes of mungbean

Table 2: Effect of post emergence herbicides on yield attributes and yields of mungbean

Treatments	Number of pods plant^{-1}	Number of seeds pods^{-1}	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Biological yield (kg ha^{-1})
T_0: Weedy Check	18.86	3.71	618.47	1194.30	1812.77
T_1: Fomesafen @ 250 g *a.i.* ha^{-1} PoE	21.42	4.09	668.49	1265.06	1933.55
T_2: Propaquizafop @ 100 g *a.i.* ha^{-1} PoE	21.51	4.15	672.42	1268.64	1941.06
T_3: Imazethapyr @ 100 g *a.i.* ha^{-1} PoE	22.84	4.59	725.46	1345.30	2070.76
T_4: Fomesafen @ 168 g *a.i.* ha^{-1} + Propaquizafop @ 52 *a.i.* ha^{-1}	23.95	5.00	776.71	1419.99	2196.70
T_5: Fomesafen @ 210 g *a.i.* ha^{-1}+Propaquizafop @ 65 g *a.i.* ha^{-1}	25.03	5.37	827.56	1495.45	2323.01
T_6: Fomesafen @ 252 g *a.i.* ha^{-1} + Propaquizafop 78 @ g *a.i* ha^{-1}	26.10	5.75	883.06	1572.94	2456.00
T_7: Fomesafen 294 @ g *a.i.* ha^{-1}+ Propaquizafop @ 91 g *a.i* ha^{-1}	27.31	6.21	935.07	1646.99	2582.06
T_8: Propaquizafop @ 50 g *a.i.* ha^{-1}+ Imazethapyr 75 @ g *a.i.* ha^{-1}	27.67	6.36	937.1	1658.52	2595.62
T_9: Two-hand weeding (15 DAS, 40-45DAS)	29.11	6.82	992.23	1783.54	2775.77
T_{10}: Weed free plot	29.57	6.96	1034.63	1809.72	2844.35
SEm+	0.34	0.12	16.02	24.03	52.09
CD at (p= 0.05)	1.02	0.36	618.47	1194.30	1812.77
CV (%)	8.36	7.89	668.49	1265.06	1933.55



Graph 2: Effect of post emergence herbicides on yield attributes and yields of mungbean

Conclusion

Based on the results of one year experimentation, it may be concluded that the weed free plot (T_{10}) were effective in increasing seed and straw yield (1143.45 kg ha^{-1} and 1886.72 ha^{-}

[1], respectively), which was remained statistically at par with two hand weeding (T_9).

Acknowledgments
A feeling of sincere and heartfelt gratitude envelops me as I draft this acknowledgement. I acknowledge my esteemed Major Advisor, advisory committee, Head, Department of Agronomy, faculty members and non-teaching staff of Department of Agronomy, Surest Gyan Vihar University, Jaipur for providing me the necessary help and suggestions during the course of the study.

References
1. Fisher RA. Statistical methods for research workers. Edinburgh, London: Oliver and Boyd; c1950.
2. Jackson ML. Soil chemical analysis. New Delhi: Prentice Hall of India Pvt. Ltd.; c1973.
3. Mirjha PR, Prasad SK, Patel S, Baghel P, Sahu M. Effect of chemical weed control on weed indices in kharif mungbean (*Vigna radiata* L. Wilczek). Environ Ecol. 2013;31:1526-9.
4. Mishra H, Kushwaha HS, Kumar AK. Effect of post-emergence herbicides on weed flora, growth and production efficiency of mungbean (*Vigna radiata*). Ann Agric Res. 2023;44(2):183-9.
5. Olsen SR, Cole CV, Watnable FS, Dean LA. Estimation of available phosphorus in soil by extraction with sodium bicarbonate. Circular 939, USDA, Washington, DC, USA; c1954.
6. Patel MM, Patel AI, Patel IC, Tikka SBS, Henry A, Kumar D, *et al*. Weed control in cowpea under rain fed conditions. In: Proceedings of the National Symposium on Arid Legumes for Food Nutrition Security and Promotion of Trade; c2003 May 15-16; Hisar, India. p. 203–6.
7. Sheoran P, Singh S, Sardana V, Bawa SS. Studies on critical period of crop-weed competition in green gram in kandi region of Punjab. Indian J Dryland Agric Res Dev. 2008;23:19-22.
8. Singh G, Aggarwal N, Ram H. Efficacy of post-emergence herbicide imazethapyr for weed management in different mungbean (*Vigna radiata* L.) cultivars. Indian J Agric Sci. 2014;84:540-3.
9. Singh G, Kaur H, Aggarwal N, Sharma P. Effect of herbicides on weeds growth and yield of greengram. Indian J Weed Sci. 2013;47:38-42.
10. Singh G, Ram IC, Singh D. Crop weed competition studies in greengram and blackgram. Trop Pest Manag. 2011;37:144-148.
11. Subbiah BV, Asija GL. A rapid procedure for estimation of available nitrogen in soils. Curr Sci. 1956;25:259-60.